

Serial No.: 10/519,469

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REMARKS

SEP 14 2007

Claims 13-14 are pending in the application, claims 1-7 having been canceled in the amendment filed April 30, 2007, and claims 8-12 having been canceled herein. Claim 13 has been amended to incorporate the limitations of now canceled claim 8.

A newly signed Declaration in compliance with 37 CFR 1.67(a) was submitted with the Amendment filed on April 30, 2007; that Declaration identified the application by application number and filing date and included the citizenship of each inventor, per the Examiner's requirement on page 2 of the Office Action mailed January 31, 2007, and repeated in the Office Action mailed on June 14, 2007. A courtesy copy of the signed Declaration is filed herewith. Each inventor's citizenship is indicated with the standard two-letter country code "KR" to represent Korean citizenship.

Claims 8 and 14 are rejected under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 13 and 14 have been amended to more clearly point out that both the first and the remaining portion of the light beam include portions of the two frequency components which are generated by the laser. Accordingly, claims 13 and 14 now set forth that the optical interferometer generates the measured signal from the first portion of the light beam. For instance, in the embodiment of the invention shown in FIG. 3 of the application, the component in the optical interferometer 60 that does the generating is the photodetector 65.

The Examiner asks how the reference light could be based on the remaining portion of the light beam. Once again with reference to the embodiment of the invention shown in FIG. 3, the remaining portion 75 of the light beam from the laser 71 is converted to an electrical signal by photodetector 73. This electrical signal serves as the claimed reference signal 76.

Claim 8 is rejected under 35 U.S.C. 102(b) as being anticipated by Kuchel (US 5,054,912). This rejection is made moot by the cancellation of claim 8 herein.

Claims 9-12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chaney (US 5,274,436, hereinafter "Chaney") in view of Xu et al. (US 5,796,482, hereinafter "Xu"). This rejection relative to claims 9-12 is made moot by the cancellation of those claims herein. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chaney in view

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of Xu, in further view of Matsumoto et al. (US 5,818,588). These rejections are hereby traversed for the following reasons.

Chaney does not show the claimed superheterodyne phase measurer coupled to a frequency converter. While Xu does show a superheterodyne phase measurer, it measures only the signal $f+\Delta f$ (refer to the upper signal path in Fig.4c of the application) and not the signal $f-\Delta f$, which the present invention also uses. As a result, in Xu, the measuring band becomes narrow (refer to 113 in Fig.4b of the application) and thus the measuring speed is limited when the direction in which the moving reflecting mirror travels is negative. In the present invention, both the signals $f-\Delta f$ and $f+\Delta f$ are used and then the phase is measured by using the signal 127, whose frequency is $f+\Delta f$ when the Doppler frequency has a positive sign and by using the signal 128 whose frequency is $f-\Delta f$ when it has the negative sign. Xu, nor any of the remaining cited references, show or suggest this claimed feature of the invention. As a result of this claimed feature, in the present invention the measuring band shows no change when the direction of motion of the moving reflecting mirror is either negative or positive and the measuring speed can be increased even if the direction of the moving reflecting mirror is negative.

It should be noted that Matsumoto is directed to decreasing a non-linearity error by providing two signals with different phases of π and then summing them. In contrast, the present invention is directed to covering the loss of the measuring band arising from frequency changes and a broadening by using signals $f-\Delta f$ and $f+\Delta f$, which is referred to in present application as a two-way heterodyne technique.

Accordingly, for all the above reasons, it is respectfully requested that the rejection of claims 13 and 14 be reconsidered and withdrawn.

CONCLUSION

Applicants respectfully submit that all pending claims are in condition for allowance, early notification of which is earnestly solicited. Should the Examiner be of the view that an interview would expedite the application at large, request is made that the Examiner telephone the undersigned attorney at (908) 518-7700 in order to resolve any outstanding issues.

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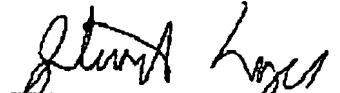
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The Office is authorized to charge any fees required, to deposit account number 50-1047.

Respectfully submitted,



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